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**REMARKS**

**Status of Claims**

Claims 1-4, 6, and 8-10 remain pending in the present application.

Claims 5 and 7 have been cancelled. Applicants have cancelled Claim 5 as being redundant in view of step (e) in Claim 1. Claim 7 has been cancelled to address the continued objection to the drawings of the present application.

Claims 1 and 8 have been amended.

For clarity and convenience, all citations to the present application will be to the as-filed, published version of present application, US 2004/0143149 (hereinafter "US149").

Independent Claim 1 has been amended to clarify the novel features of the present invention, based on the as-filed disclosure, US 149, as follows. The present invention generally relates to a method for minimizing formation of thermal nitrogen oxides during incineration of: (i) a waste stream; (ii) an oxygen-containing stream comprising air; and (iii) supplemental fuel comprising at least one hydrocarbon, which is burned to incinerate the waste stream, during which thermal nitrogen oxides are formed (support found in present specification, US149, in [0005], [0007] and [0039]). Moreover, the method of the present invention comprises, among others, the steps of: producing a preheated waste stream by directing the cooled waste stream through a heat exchanger system which transfers thermal energy from another process stream to the waste stream (support found in present specification, US149, in 23] and [0044]), and incinerating the preheated waste stream by directing it into an incinerator with an amount of the supplemental fuel which is less than the amount required to incinerate the cooled waste stream of step (c) (support found in present specification, US149, in [0014], [0023] and [0044]). As also recited in amended independent Claim 1, during the incineration step, a decreased amount of thermal nitrogen oxides is produced compared to the amount of thermal nitrogen oxides that would have been produced by incinerating the cooled waste stream of step (c), without performing preheating step (d) (support found in present specification, US149, in the Abstract, [0014] and [0044]).

Claim 8 has been amended simply to correct an error whereby the claim language is internally consistent and now corresponds to the language of the specification (see US149, [0008]).

Claims 9 and 10 have each been amended so that their language is more consistent with the method recited in amended independent Claim 1.

#### The Present Invention as Claimed

As recited in amended independent Claim 1, the present invention generally relates to a method for minimizing formation of thermal nitrogen oxides during incineration of (i) a waste stream; (ii) an oxygen-containing stream comprising air; and (iii) supplemental fuel comprising at least one hydrocarbon; which is burned to incinerate the waste stream, during which thermal nitrogen oxides are formed. More particularly, the method of the present invention comprises a number of steps including, but not limited to: (c) separating a cooled mixed gas stream (comprising a reaction product) into a cooled crude product stream and a cooled waste stream; (d) producing a preheated waste stream by directing the cooled waste stream through a heat exchanger system which transfers thermal energy from another process stream to the waste stream; and (e) incinerating the preheated waste stream by directing it into an incinerator with an amount of the supplemental fuel which is less than the amount required to incinerate the cooled waste stream of step (c). Additionally, in the method of the present invention, as recited in amended independent Claim 1, during the incineration step, a decreased amount of thermal nitrogen oxides is produced, compared to the amount of thermal nitrogen oxides that would have been produced by incinerating the cooled waste stream of step (c) without performing preheating step (d) (see US149, Abstract, [0014] and [0044]).

The remaining pending Claims 2-4, 6, 8-10 are each dependent, directly or indirectly, from amended independent Claim 1.

The Technical Niche of the Present Invention in the Relevant Art

In the chemical process industry, it is often necessary to lessen the quantity of nitrogen oxides (NO<sub>x</sub>) in a process stream before the stream may be used elsewhere in the overall chemical process, or discharged to the atmosphere. A process stream which already contains NO<sub>x</sub> requires "abatement," which is readily understood by persons of ordinary skill in the relevant art to mean chemical or physical treatment methods which will destroy, convert, or separate at least a portion of the NO<sub>x</sub> already present in the process stream. (See paragraphs [0009]-[0010] of US149).

However, it would be more advantageous to prevent or at least minimize the formation of nitrogen oxides, whereby the need to perform abatement will be lessened, minimized, or may even be eliminated altogether. (See paragraph [0010] of US149). In particular, sometimes one or more NO<sub>x</sub>-forming steps in the process can be identified, during which new quantities of NO<sub>x</sub> are formed, which increases the quantity of NO<sub>x</sub> that is present in the process stream after such step(s). This presents the opportunity to adjust various operating conditions of the process to minimize the formation of NO<sub>x</sub> during such NO<sub>x</sub>-forming steps. For example, without intending to limit the types of NO<sub>x</sub>-forming steps, the step of incinerating a waste stream, with air and hydrocarbon fuel, tends to favor formation of NO<sub>x</sub>, producing an effluent stream which contains thermal NO<sub>x</sub>, even though the waste stream may initially have contained little, or zero, NO<sub>x</sub>.

As discussed in the present specification (see paragraphs [0007]-[0008] of US149), the formation of "thermal NO<sub>x</sub>" occurs when nitrogen present in atmospheric air is subjected to high temperatures in the presence of hydrocarbons, such as in conventional combustion and incineration apparatus. It is, of course, well-known in the art to use any one of various well-known abatement methods (to treat, convert and/or destroy NO<sub>x</sub> after it has formed and is present in the stream) to lessen the quantity of thermal NO<sub>x</sub>. Such abatement methods include, but are not limited to, catalytic treatment of an effluent stream containing NO<sub>x</sub> (e.g., selective catalytic reduction, "SCR", which is the method disclosed in Schofield, cited by the Examiner; see also, US149, [0008]).

Of course, it is preferred, to minimize the amount of NOx which will need to be destroyed, converted or separated in a subsequent abatement step, by first minimizing NOx formation in one or more NOx-forming steps. The incineration of a waste stream with air and at least one hydrocarbon fuel is a thermal NOx-forming step because, even in a waste stream initially devoid of thermal NOx, nitrogen is introduced into the process via the air used to promote incineration, and NOx species are formed during incineration. The present invention teaches a method of performing incineration which minimizes formation of thermal NOx during the incineration step. This is accomplished in the present invention by preheating the waste product stream prior to undergoing incineration (see US149, [0019]).

It is clear to persons of ordinary skill in the relevant art that preventing or minimizing the formation of NOx is very different from abatement (i.e., destruction or conversion) after the NOx has already been formed. As mentioned hereinabove, minimizing formation of NOx often, in turn, minimizes or eliminates the need for abatement thereafter because it decreases the amount of NOx present in the waste stream compared to the amount of NOx that would have been present after incineration if the method of the present invention was not performed. Clearly, there is no need to destroy, convert or separate NOx which is never formed. While the methods of reducing the amount of NOx in a process stream disclosed by Schofield and claimed by applicants involve different, non-interchangeable process steps, it is possible to beneficially and efficiently employ them together by, first, modifying process operating conditions to minimize formation of NOx in otherwise NOx-forming steps (as in the method of the present invention), followed by one or more abatement steps (such as the SCR disclosed by Schofield). The abatement step(s) can be expected to further reduce the amount of NOx in the stream by destroying, converting or separating at least a portion of any NOx which is formed during the NOx-forming step, notwithstanding adjustment of operating conditions, or which was already present in the stream prior to the NOx-forming step.

The addition of heat to the incineration/combustion step (for example, by preheating the waste stream as recited in amended independent Claim 1), permits a

commensurate reduction in the amount of supplemental fuel required for the incineration/combustion, which saves energy and also lessens the quantity of reactants available for conversion into thermal NO<sub>x</sub> (see US149, [0019] and the Example). In turn, the less supplemental fuel that is fed to the incineration step, the less the quantity of NO<sub>x</sub> formed in the incineration/combustion step, which produces an incinerated waste stream which contains less NO<sub>x</sub> than it would have had, in the absence of the preheating step. Moreover, overall process efficiency may be increased by application of the present invention in an embodiment wherein the heat used to preheat the waste products, for example, is derived from simultaneously cooling the raw product stream derived from the same process in a heater exchanger (i.e., the "mixed gas stream") (this embodiment is covered by the subject matter of dependent Claim 2). (See US149 in [0005], [0007], [0009] and [0022]-[0023]).

#### Objection to Drawings

The drawings continue to be objected to under 37 C.F.R. § 1.83(a) because the features recited in Claim 7 are not all shown in the drawings. By the foregoing amendments, Claim 7 has been cancelled from the present application. It is believed that cancellation of Claim 7 renders this objection moot and its withdrawal is hereby respectfully requested.

#### Claim Rejections Under 35 U.S.C. §§ 102 and 103

On pages 6-8 of the Office Action, the rejection of Claims 1, 2, 4, 5, and 8-10, under 35 U.S.C. § 102(b), as being anticipated by Schofield (US3,977,832), has been maintained. The Examiner asserts that Schofield discloses all the features of Claims 1, 2, 4, 5, and 8-10 in the description of existing nitric acid technology.

Additionally, on pages 9-10 of the Office Action, the rejection of Claims 1-5 and 8-10, under 35 U.S.C. § 103(a), as being obvious and, therefore, unpatentable over Applicants' own disclosure in view of Schofield, has been maintained. The Examiner believes that while the features of (1) producing a cooled mixed gas stream by directing the hot mixed gas stream through a heat exchanger system to form a preheated waste

gas stream, (2) using preheated supplemental fuel to incinerate the waste gas stream, and (3) using preheated oxygen-containing stream to incinerate the waste gas stream, are not expressly disclosed in Schofield, these features would be obvious modifications or enhancements to the prior art process.

Finally, on pages 11-12 of the Office Action, the rejection of Claims 6 and 7, under 35 U.S.C. § 103(a), as being obvious and, therefore, unpatentable over in view of Schofield as applied to Claim 1, and further in view of Eagle et al. (US4,230,699), which the Examiner asserts teaches the modification of a process involving heat exchange to utilize shell and tube heat exchangers and that equipping the heat exchangers with baffles is merely a design modification within the ordinary skill of persons in the art.

Applicants respectfully traverse each of these rejections for the reasons which follow.

Schofield fails to anticipate, or make obvious, the present invention as recited in amended independent Claim 1.

Schofield fails to disclose a method for minimizing formation of nitrogen oxides during incineration of a waste stream, during which thermal nitrogen oxides are formed. Rather, Schofield discloses a method for abatement, i.e., destruction or conversion, of nitrogen oxides which are already present in a waste stream. In particular, the process of Schofield involves heating the waste stream in successive heat transfer devices, including a direct fired heater 31, and then subjecting the heated waste stream to abatement, by selective catalytic reduction during which existing NO<sub>x</sub> is chemically reduced to N<sub>2</sub>. The nitrogen oxides to be converted in the catalytic reduction step are not formed during catalytic reduction (in abatement unit 35), but rather, they were intentionally produced during previous steps of the overall process described in Schofield (see Col. 3, lines 52-55), and must be destroyed or converted to elemental nitrogen before further use or discharge of the waste stream. It is explained in Schofield (Col. 1, lines 62-65) that "heating of the tail gas, moreover, raises the temperature thereof to an efficient level for promoting the catalytic reduction of the residual NO<sub>x</sub> [i.e., left over from earlier process steps] in the abatement unit," instead of preventing or

minimizing formation of NO<sub>x</sub> during abatement of the waste stream comprising tail gas as in the present invention.

Nor would it be obvious or suggested to a person of ordinary skill in the relevant art to modify the Conventional Acrylic Acid Industrial Processes based on the teachings of Schofield because these sources concern fundamentally different processes. More particularly, persons of ordinary skill having to address the problem of minimizing formation of NO<sub>x</sub> formed during incineration of a waste stream, would not look to the process described in Schofield for modifications to the incineration step because Schofield teaches abatement of NO<sub>x</sub> already existing in a waste stream, by selective catalytic reduction. Incineration, used in the method of the present invention, nearly completely burns (i.e., oxidation – addition of oxygen atoms) and destroys the waste stream, but thermal NO<sub>x</sub> is also formed as an unwanted by-product of the burning during this step. During the selective catalytic reduction step disclosed in Schofield, NO<sub>x</sub> is reduced (removal of oxygen) to N<sub>2</sub>, but the waste stream is not destroyed to the required extent.

In view of the foregoing, simply replacing the incinerator step of a Conventional Acrylic Acid Industrial Process with a selective catalytic reduction like that disclosed in Schofield would not be beneficial since, if the waste stream is not incinerated with air and hydrocarbon fuel, no thermal NO<sub>x</sub> is formed. There would not be any NO<sub>x</sub> in the waste stream and SCR becomes unnecessary, while high efficiency destruction of the waste stream would still be required and SCR would not be capable of achieving that level of destruction.

Furthermore, Schofield teaches preheating, as well as further heating of the waste stream, before subjecting it to SCR and explains that (a) the waste stream must be heated to a temperature sufficient to deliver power to a turbine system; and (b) increasing the temperature of the waste stream promotes reduction of the NO<sub>x</sub> to N<sub>2</sub> during SCR. There is nothing to suggest that preheating a waste stream which does not already contain NO<sub>x</sub> before incinerating the stream would diminish or minimize formation of NO<sub>x</sub> during incineration. Thus, a person of ordinary skill in the art would not, based on the aforesaid teachings of Schofield, be motivated to preheat a waste

stream that undergoes incineration with the expectation that such preheating would minimize formation of NO<sub>x</sub> during incineration.

If the disclosure of Schofield might be of any use to persons of ordinary skill in the art, it might be to modify a Conventional Acrylic Acid Industrial Processes to include a selective catalytic reduction step, after the incineration of a preheated waste stream, to reduce any NO<sub>x</sub> that is formed during incineration notwithstanding the preheating of the waste stream. It is clear, however, that the technology disclosed in Schofield cannot replace or directly alter Conventional Acrylic Acid Industrial Processes with the reasonable expectation that such alterations would minimize formation of NO<sub>x</sub> during incineration of a waste stream.

Conventional Acrylic Acid Industrial Processes could not be modified in view of the disclosure of Schofield to achieve the method of the present invention wherein incineration of a preheated waste stream occurs in an incinerator with an amount of the at least one hydrocarbon fuel which is less than the amount required to incinerate the cooled waste stream. Furthermore, modification of the Conventional Acrylic Acid Industrial Processes in view of the disclosure of Schofield would not decrease the amount of thermal oxides produced during the incineration step, compared to the amount of thermal nitrogen oxides that would have been produced by incinerating the cooled waste stream without performing the preheating step.

While the process disclosed in Schofield, and the method of the present invention claimed in Claim 1, both aim to diminish the amount of NO<sub>x</sub> in a waste stream prior to further utilization or discharge of the stream to the atmosphere, they accomplish this in different ways, in the context of different chemical processes.

The process disclosed in Schofield involves abatement (i.e., destruction or conversion) of NO<sub>x</sub> already present in a waste stream which is derived from a process for producing nitric acid, i.e., a process which intentionally produces NO<sub>x</sub> species. In summary, Schofield discloses a process wherein:

- ammonia is oxidized to nitrogen oxide (NO), which is then further oxidized in the presence of excess oxygen, to nitrogen dioxide (NO<sub>2</sub>) or its dimer, in an oxidation reactor (i.e., the converter 20);



- the effluent from the oxidation reactor 20 is cooled by passing it, successively, through a waste heat boiler 21, a heat exchanger 22 and a cooling condenser 23; and
- the cooled effluent stream is then fed to an absorber wherein the NO<sub>2</sub> is absorbed in water and, thereby, converted to nitric acid ( $3\text{NO}_2 + \text{H}_2\text{O} \Rightarrow 2\text{HNO}_2 + \text{NO}$ ).

Of course, as expected, some of the NO<sub>x</sub> (both NO<sub>2</sub> and NO) is not converted or absorbed during the oxidation and absorption steps and, therefore, becomes a component of a waste stream (i.e., the "tail gas of the absorber") which Schofield teaches is used to provide heat energy to a turbine system. The turbine system drives air compressors which provide high pressure fluid to the oxidation reactor, which tends to increase the oxidation rate of NO to NO<sub>2</sub>. However, before this waste stream can be provided to the turbine system, it must be heated to the temperature required by the turbine system, and the already-formed and unconverted NO<sub>x</sub> must be abated (i.e., destroyed or converted) to prevent corrosion of the turbine blades. See, Schofield, Col. 1, lines 6-41.

Rather than minimizing formation of NO<sub>x</sub> as in the present invention recited in amended independent Claim 1, Schofield teaches treatment of a NO<sub>x</sub>-containing waste stream by a well-known abatement method, i.e., selective catalytic reduction, using an "abatement unit 35" (Schofield, Col. 4, line 30) which is also referred to as the "catalytic combustion unit 35" (Schofield, Col. 5, line 18). The selective catalytic reduction disclosed in Schofield is described by the passages quoted by the Examiner on page 4 of the final Office Action, wherein it is stated that the waste stream is contacted with a catalyst to "reduce" the NO<sub>x</sub> to N<sub>2</sub> and water (see Schofield, Col. 4, lines 11-47). Apparently, the Examiner has mistakenly interpreted these passages to constitute a disclosure of a method of minimizing formation of NO<sub>x</sub> by preheating a waste stream. It is respectfully submitted, however, that the terminology used in Schofield has been misinterpreted, and the difference misunderstood between the two methods of "reducing" the amount of NO<sub>x</sub> in a process stream – either by chemical "reduction" of existing NO<sub>x</sub> (removal of oxygen atom(s)) to form N<sub>2</sub> and water, or by preventing formation of NO<sub>x</sub> during incineration of waste with air and hydrocarbon fuel. Chemical reduction of NO<sub>x</sub> already present in a process stream, which destroys and converts it to

nitrogen and water, clearly does not in any way address the preference to prevent or minimize formation of the NO<sub>x</sub> in the abatement unit. As acknowledged by Schofield (Col. 1, lines 62-65), preheating the waste stream which already contains NO<sub>x</sub> promotes the catalytic reduction (conversion) of existing NO<sub>x</sub> to nitrogen and water. This is totally different from preventing or minimizing formation of NO<sub>x</sub> in a process step which otherwise tends to promote formation of thermal NO<sub>x</sub> (such as in incineration with air and hydrocarbon fuel) (see amended Claim 1: “. . . during incineration . . . to incinerate the waste stream, during which nitrogen oxides are formed). Nowhere does Schofield disclose, discuss the desirability of preventing or minimizing formation of NO<sub>x</sub>, since it is dealing with abating NO<sub>x</sub> that has already been formed in a process which intentionally produces NO<sub>x</sub> in earlier steps (i.e., oxidation of ammonia to preferentially form NO<sub>2</sub>).

Moreover, the process steps disclosed in Schofield which relate to treatment of the waste stream (“tail gas”) more likely teach away from the present invention because more hydrocarbon fuel is used, rather than less, as in the present invention, because the process disclosed by Schofield requires the temperature of the waste stream to be higher than can be achieved using only heat exchangers and other hot process streams. In particular, Schofield teaches preheating and heating the waste stream with heat exchangers, and then further heating the waste stream in a direct fired heater 31, before sending the heated waste stream to the abatement unit (35) along with more hydrocarbon fuel. (See Schofield, Col. 4, lines 26-40). There are no energy savings realized by preheating the waste stream prior to the abatement step as taught by Schofield. If one or more of the heating steps applied to the waste stream in Schofield are eliminated, and then the temperature of the waste stream would not be high enough to operate the turbine system. Thus, heating the waste stream prior to feeding it to the abatement unit 35 does not minimize formation of NO<sub>x</sub> during the abatement reactions, but rather provides the necessary energy to operate the turbines after exiting the abatement step.

On the other hand, the method of the present invention as recited in amended independent Claim 1, achieves energy savings by diminishing the quantity of fuel

necessary to perform the incinerator step which is accomplished by preheating the waste stream fed to the incinerator, using a heat exchanger that transfers heat from another hot process stream to the waste stream. It is noted that the method of the present invention replaces a direct fired heater with a heat exchanger, or substitutes hot process gas for steam or other hot fluid created solely for the purpose of providing heat. The method of the present invention, rather than by a heat exchanger and a direct fired, fuel-consuming heater used in Schofield.

More particularly, in Schofield, the waste stream ("tail gas") is first fed to a preheater 28 (heat provided by steam), and then into a heat exchanger 22 which transfers heat from the hot product gas of the oxidation reactor to the waste stream, and finally through a direct fired heater 31 which burns hydrocarbon fuel to further elevate the temperature of the tail gas. Then, the preheated, heated, and heated again, waste stream is fed into the abatement unit 35 where it is converted ("reduced") to nitrogen and water by combustion. The NO<sub>x</sub> in the waste stream of Schofield was already present in the waste stream prior to reaching the abatement/combustion unit 35 and needed to be converted or removed. The additional heating step using the direct fired heater 31, as taught by Schofield, consumes additional hydrocarbon fuel, not less as in the present invention, and therefore, there would be no hydrocarbon fuel savings and no minimization of formation of NO<sub>x</sub> in the abatement unit 35 of Schofield.

Contrary to the Examiner's assertion on page 8 that the "combustion heater (31) and catalytic combustor (35) of US003977832 (Schofield) are deemed to be the structural and functional equivalent to applicant's claimed "incineration apparatus," the proper analogy would be the apparatus of each method which accomplishes preheating a waste stream and burning the waste stream with less hydrocarbon fuel than would have to be used without preheating. Thus, Schofield's preheater 28, heat exchanger 22, direct fired heater 31, and combustion unit 35 might be analogous to applicants' heat exchanger 200 and incinerator 500. These groups of apparatus, however, cannot be considered structurally and functionally equivalent because Schofield's apparatus includes additional apparatus to heat, not just preheat, the waste stream and, in fact, uses more hydrocarbon fuel than applicants' apparatus. Applicants' apparatus uses

only a heat exchanger, which acquires heat from the another hot process stream (not hydrocarbon fuel), and an incinerator, and thus, overall, applicants' apparatus requires less hydrocarbon fuel to preheat and incinerate the waste stream than would have to be used without preheating.

Thus, Schofield fails to disclose a method for minimizing formation of NO<sub>x</sub> during incineration of a waste stream. Nor does Schofield disclose incinerating the waste stream using an amount of hydrocarbon fuel that is less than the amount that would be required to incinerate the cooled waste stream (i.e., prior to preheating the waste stream), but rather, Schofield teaches the opposite – use more hydrocarbon fuel in a direct fired heater after heat is transferred from the hot gas product to the waste stream. Lastly, Schofield fails to disclose the use of an incinerator to burn a waste stream, which involves simple, catalyst-free oxidation (addition of oxygen atoms), but rather, Schofield teaches the use of an abatement unit 35 (catalytic combustion unit), to chemically “reduce” the NO<sub>x</sub> and, thereby convert it to nitrogen and water. In fact the chemistry occurring in each of Schofield and the present invention are chemically opposite – reduction vs. oxidation. Thus, based on the disclosure in Schofield, persons of ordinary skill in the relevant art would not have believed that application of techniques practiced and disclosed in Schofield for preheating, heating and direct fire heating of a NO<sub>x</sub>-containing waste stream which is then fed to a catalytic reduction process, could have been successfully applied to the incineration/oxidation step of the present invention and to minimize formation of NO<sub>x</sub> during incineration.

Neither the disclosure of the present specification relating to Conventional Acrylic Acid Industrial Processes, nor the disclosures of Schofield, whether taken alone or in combination, suggest or make obvious the present invention as recited in amended independent Claim 1. The process disclosed in Schofield concerns abatement of existing NO<sub>x</sub>, intentionally formed in previous process steps and involves selective catalytic reduction of the NO<sub>x</sub>, whereas the method of the present invention concerns minimizing formation of NO<sub>x</sub> during incineration of a waste stream. In view of the basic differences between the overall processes involved in each source, persons of ordinary skill in the art would not have thought to combine the teachings of these references to

modify Conventional Acrylic Acid Industrial Processes by preheating the waste stream and incinerating the waste stream with an amount of the supplemental fuel which is less than the amount required to incinerate the cooled waste stream, wherein, as recited in amended independent Claim 1, during the incineration step, a decreased amount of thermal nitrogen oxides is produced, compared to the amount of thermal nitrogen oxides that would have been produced by incinerating the cooled waste stream. As discussed above, attempts to combine these teachings would not result in the method of the present invention and would likely destroy the ability of Conventional Acrylic Acid Industrial Processes to function as intended (i.e., the wrong type of step would be used in place of incineration and the NO<sub>x</sub> would not be sufficiently burned and destroyed).

Based on the foregoing explanation, it is believed that the present invention, as recited in amended independent Claim 1, is novel and unobvious over Schofield, and the combination of Conventional Acrylic Acid Industrial Processes and Schofield. Since each of the remaining Claims 2-4, 6, and 8-10 depend, either directly or indirectly, from amended independent Claim 1, it is believed that these claims are also allowable over Schofield, and the combination of Conventional Acrylic Acid Industrial Processes and Schofield. Withdrawal of the rejections of Claims 1-4, 6, and 8-10, under 35 U.S.C. §§102(b) and 103(a), is therefore, hereby respectfully requested.

With regard to the Examiner's continued rejection of Claims 6 and 7, under 35 U.S.C. § 103(a), as being obvious in view of Schofield and further in view of Eagle et al. (US4,230,669), it is noted that Claim 7 has been cancelled.

Concerning Claim 6, it is believed that the present invention, as recited in amended independent Claim 1, is novel and unobvious over Schofield because Schofield fails to disclose or suggest either a method for minimizing formation of NO<sub>x</sub> during incineration of a waste stream by preheating the waste stream, or a process wherein avoidance or minimization of formation of NO<sub>x</sub> during incineration is addressed in any way. The Examiner has cited Eagle et al. for its disclosure of heat exchanger configurations and features. These disclosures, however, fail to remedy the aforesaid deficiencies of Schofield. Eagle et al. in no way discloses or suggests a method for minimizing formation of NO<sub>x</sub> during incineration by preheating a waste stream. Since

Claim 6 depends from amended independent Claim 1, it is believed that Claim 6 is also novel and unobvious over both Schofield and Eagle et al., whether taken alone or in combination. In the foregoing circumstances, withdrawal of the rejection of Claims 6 and 7 is hereby respectfully requested.

CONCLUSION

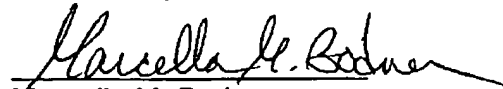
Based upon the foregoing Remarks and explanation, Applicant and his attorney hereby respectfully request re-examination and allowance of Claims 1-10. In summary, it is believed that the present invention, as recited in amended independent Claim 1, is patentable and allowable over Schofield, as well as the combinations of Conventional Acrylic Acid Industrial Processes and Schofield, as well as Schofield and Eagle et al. Since each of Claims 2-4, 6, and 8-10 depend, directly or indirectly, from amended independent Claim 1, it is also believed that the each of dependent Claims 2-4, 6, and 8-10 is also patentable and allowable over Schofield, as well as the combination of Schofield and Eagle et al.

A fee of \$790 is believed to be due for the accompanying Request for Continued Examination, and an extension fee of \$1020 is believed to be due in connection with submission of this Amendment within three (3) months after the due date set by the Office Action. These fees are both addressed by the Request for Continued Examination which accompanies this Amendment.

If any additional fees are due, including extension and petition fees, in connection with the submission of this Amendment, the Examiner is hereby authorized to charge them, as well to credit any overpayments, to **Deposit Account No. 18-1850**.

Date: **July 18, 2006**  
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